U.S. NAVAL BASE, PEARL HARBOR, FORD ISLAND 5-INCH ANTIAIRCRAFT BATTERY, BATTERY COMMAND CENTER
(U.S. Naval Base, Pearl Harbor, Naval Station Ford Island)
(Battery No. 7, Oahu 5-Inch Naval Antiaircraft Shore Batteries)
Pearl Harbor
Honolulu County
Hawaii

HAER No. HI-85-A

BLACK & WHITE PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
U.S. Department of the Interior
National Park Service
Oakland, California

HISTORIC AMERICAN ENGINEERING RECORD

U.S. NAVAL BASE, PEARL HARBOR,
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HAER No. HI-85-A

Location: Ford Island
Pearl Harbor National Historic Landmark
City and County of Honolulu, Hawaii

USGS 7.5 minute series topographic map, Pearl Harbor, HI, 1999.
Universal Transverse Mercator (UTM) coordinates:
04.608380.2363090.

Date of Construction: 1942-1943

Designer: Honolulu District Engineer, U.S. Army Corps of Engineers.

Builders: Navy provided initial construction work force – personnel from vessels damaged in the Pearl Harbor attack. Battery was completed by Honolulu District Engineer, U.S. Army Corps of Engineers.

Owner: United States Navy

Present Use: Abandoned, re-covered with earth.

Significance: This antiaircraft battery command center and its gun emplacements are associated with the hasty construction of nine 5-inch antiaircraft defensive positions in the months after the 7 December 1941 Japanese attack on Pearl Harbor, when an invasion of Oahu was thought to be imminent. Some of the 5-inch guns and gun directors used in the batteries were salvaged from ships damaged and/or sunk during the attack, possibly including the 5-inch guns of this battery.

Prepared by: Dee Ruzicka
Architectural Historian
Mason Architects, Inc.
119 Merchant Street, Suite 501
Honolulu, HI 96813

Date of Report: November 2008

DESCRIPTION

During excavations for utility lines associated with new housing on Ford Island, which lies within the Pearl Harbor National Historic Landmark, the remains of three structures (one command center and two gun emplacements for 5-inch[1] antiaircraft guns) were unearthed. These three structures comprise a portion of an antiaircraft battery, one of nine that were constructed during the months after the Pearl Harbor attack. Some of these antiaircraft shore batteries used 5-inch guns that were salvaged from Navy ships damaged or sunk during the attack. The three structures were discovered at the north end of Ford Island. The roads in this portion of the island have been altered numerous times in recent years. These structures were unearthed at a location approximately 500' east of the current traffic circle at the intersection of Ford Island, Chaffee, and O'Kane Boulevards. They had been covered by about three to four feet of overburden. The surface above the three structures had recently been paved or planted with landscaping, due to the construction of a different traffic circle, around the time of the opening of the Admiral Clarey Bridge in April 1998.

For descriptions of the other structures unearthed, see their associated HAER reports:

HAER HI-85-B, U.S. Naval Base, Pearl Harbor, Ford Island 5-Inch Antiaircraft Battery, East Gun Emplacement.

HAER HI-85-C, U.S. Naval Base, Pearl Harbor, Ford Island 5-Inch Antiaircraft Battery, South Gun Emplacement.

For historical context information on this antiaircraft battery see the overview report:

HAER HI-85, U.S. Naval Base, Pearl Harbor, Ford Island 5-Inch Antiaircraft Battery

Command Center

This structure is the command center for an antiaircraft gun battery. It is located about 325' west-southwest of Facility 337 in the neighborhood at the north end of Ford Island. It has an irregular footprint with overall dimensions of about 32' x 46'. The west portion of this structure was originally constructed to be underground; however, its entire roof is missing. The command center is built with concrete walls, typically about 1'-0" thick. The walls have a smooth interior surface and an exterior surface which is rough, indicating that that they were cast with forms on the interior only; the edge of the excavated earth formed the exterior side. When uncovered, some green and white paint was found on most of the interior wall surfaces of the command post. The floor level of the underground portion of the command post is approximately 10'-6" above sea level and the floor level of the portion which was approximately at (or slightly above grade) is about 16'-6" above sea level. Measurements of the height of floors above sea level were taken by Forest City surveyors and supplied to this author. These measurements are difficult to correlate precisely with historic grade levels because the amount(s) and date(s) of filling and earth moving here are unknown. Although much fill had been removed from the structure at the time of the field visits for this report, all of the floors and stairs of the underground portion were still covered with earth, which prevented observation of the floor, the

[1] Navy guns are designated by their bore diameters. Because this term is used a type description, it is written as 5-inch, rather than using the quotation marks (5") employed for measurements in inches.

lower portion of the walls, and most of the stairs here. The floor of the above-grade portion and the first few steps downward from that level had been cleared of fill for the field visits.

An entry stairway on the south side provided access to the command post. This 4'-9" wide stairway (stairs covered with earth) opens into a corridor at right angles to it. A left turn into this corridor leads to the underground portion of the structure, along the west side, and a right turn leads up a stairway to the above-ground portion along the east side of the command post. The top of the walls at the west end of the corridor are about 1' lower than the top of the walls at the east end. The top step of the stairway which leads down into the corridor is about 2' below the top of the wall at the southwest corner of the corridor. This top step could possibly indicate grade level at the time of construction.

The underground portion of this structure consists of two rooms, both of which have some white paint remaining on their interior walls. The south room is accessed via a 3'-0" wide doorway from the entry corridor. The door is flush metal on the room side and is braced by crossed steel ribs on the corridor side. It is constructed of approximately ⅛" thick steel plate and on its flush side has three strap hinges, a handle latch, and one pivoting latch of bent metal near the top of its striker edge. The bottom portion of the door was not observable due to the amount of unexcavated fill remaining on the floor of the command post. A similar door, unearthed during excavation, has three gas-proof valves in its lower portion. These valves are top-hinged metal flaps which seal against small (approximately 3" diameter) holes in the door. The valves appear to be of a non-ferrous metal; they are not rusted and have a green patina. The unearthed door also has an additional pivoting latch near the bottom of its striker edge.

The south room of the underground portion of the command center is 12'-0" wide (east/west) and 16'-6" long (north/south). The tops of the structure walls along this (west) side are not damaged and mostly retain their original hand-parged flat surface, which is approximately 8'-0" above the floor slab. There is no indication of any attachment for the roof at the wall tops, nor was any broken roof material found in the excavation. The roof may have been constructed of pre-cast concrete slabs laid across the tops of the walls and covered with earth, which were all removed before the abandoned structure was buried. This type of roof was known to have been used for World War II (WWII) underground splinterproof shelters at Pearl Harbor.[2] Near the mid-point of the west (exterior) wall of the south room, about 1'-0" below the top of the wall is a circular opening through the wall that is lined with a 10"-diameter steel pipe sleeve that is cut off flush with the wall surfaces. This opening might have been used for a vent and blower which supplied outside filtered air in the event of a gas attack.[3] On the south wall of this room, two electrical conduits that are fixed to the wall extend up from the fill covering the floor. One conduit is attached to a wider elbow fitting, allowing it to turn 90° to run through the wall to the entry corridor; the other conduit supplies an electrical outlet box near the door.

At the north wall of this room is a doorway leading into the 12'-0" x 9'-6" north room. The door is similar to the one described above and opens into the larger south room. The north room also has a similar 10"-diameter circular opening near the mid-point of the exterior (west) wall. At the southeast corner of this room is a doorway (3'-0" wide) which opens to a 3'-4" wide stairway

[2] Mason Architects, Inc. *Historic Context Report and Historic Preservation Plan for World War II Defensive Accessory Facilities, Building Types Assessment: Splinterproof Shelters and Gun Emplacements.* (Honolulu: Naval Facilities Engineering Command, Pacific, November 2004), 1.3-64.
[3] John D. Bennett, memorandum to Ann Yoklavich, Mason Architects, 23 July 2007.

going up and east to the above-ground portion of the command post. The north room has both white and green paint remaining on its interior; green on the lower half of the walls and white on the upper half. The north wall of the north room is pierced by six conduit sleeves, four of which contain the stub of a metal pipe. Near floor level on the east wall, just north of the stairway to the above-ground section, is a small tunnel about 2' square that extends in a southeast direction for approximately 10'. The far end of the tunnel is blocked by banked earth. There are two metal brackets along its upper south edge which appear to have carried pipes or wires.

A third small area, 4'-0" wide and 4'-6" long, lies adjacent to the north side of the north room. This area has no doorway and is connected to the north room only by a small 1'-0" square opening through the concrete which separates it from the north room. This square opening is next to the six conduit sleeves, about 3'-0" from the top of the wall. This small area has only had the fill removed down to the level of the square opening, so there is no indication of its interior height. This enclosure appears to have been accessed from the exterior of the command post. The section of wall separating this area and the north room has a total thickness of about 1'-8", which includes the approximately 1' thick wall of the north room and the approximately 8" thick wall of the small area. The tops of the small area's walls are roughly broken off at the level of the top of the north room walls, indicating that they originally extended upward and that this small area was higher than the underground portion of the command post.

The portion of the command post which is presumed to have originally been above ground extends along the east side of the structure and measures 9'-9" wide (east/west) and 21'-0" long (north/south). This portion has a concrete floor slab that is stepped, with its two levels about 6'-6" and 7'-4" higher than the floor of the underground rooms. The single step in this floor slab is near the mid point of its length, 10'-3" from the north wall. The slab steps down about 10" from the south section to the north section. The remains of the exterior (east and north) walls of this above-ground section are low and broken at the tops, varying in height from 1'-4" to 4'-0" above the height of the floor slab. It is likely that the walls at this section were retaining walls and that the area was not roofed, possibly to view potential targets and for the use of an optical gun director which could have been installed here. At the northeast corner the retaining walls are thicker (overall thickness approximately 1'-6") than is typical of the command post walls.

The above-ground portion is accessed, at its south end, from a quarter-turn stair that extends up from the east end of the entry corridor. At the south end of the above-ground portion, about 1'-10" from the top of the stairs, is a 4'-0" square impression in the concrete floor slab that was apparently made from a steel plate, now removed. This impression is about ½" deep and has the remains of mounting bolts approximately ½" in diameter imbedded in the concrete at each corner. A small-diameter conduit is located off-center, containing a thick wire. Both the pipe and wire are cut off flush with the bottom of the impression.

There is a similar feature imbedded in the concrete floor near the north end of the above-ground portion of the command post. This is located 2'-2" from the top of the stairs which lead up from the north room of the underground portion. It consists of a ¾" thick steel plate, flush with the floor slab, with mounting bolts at its corners and short pieces of bent steel rod protruding from it. The plate is 3'-8" square and has a 1'-6" square hole in its center. The earth-filled hole was excavated to 4" below the plate. It is not known if there is concrete under this center hole or if the slab was poured with an opening here. It is possible that the tunnel found in the north

underground room leads to this hole; the tunnel's orientation and length are suggestive of this. Two conduit stubs protrude into the sides of the hole; one contains a thick wire.

The center section of the command center is an area measuring about 4' to 6'-9" wide and 17' long. Located between the underground and above-ground portions of the command post, it was not excavated for the original construction. One reason may have been to provide additional protection for the south underground room. The wider south end of this section is undisturbed coral concretion. The north end of this center section is narrower, with rubble fill on its surface.

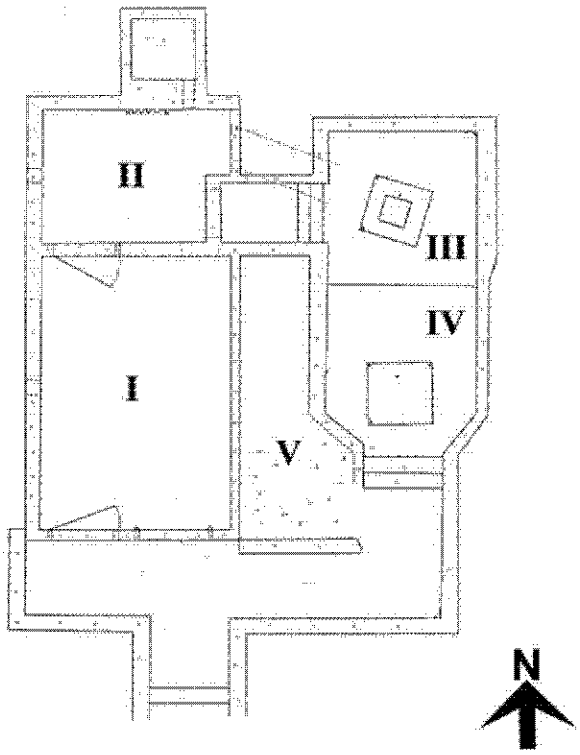

Fig 1. Sketch of the remains of the battery command center with possible identity of areas:
I – Plotting room (underground)
II – Fire control switchboard (underground)
III – Gun director (Mark 19?) (above ground)
IV – Optical instrument for aiming (rangefinder?) (above ground)

The small enclosure north of the fire control switchboard room (II) is thought to be for a generator or fire control computer. The tunnel leading from the fire control switchboard room to below the metal plate (in area III) is thought to be for data and electric cables from the fire control switchboard to the gun director.[4]

[4] Ibid.

Description of artifacts unearthed from the command center

During excavation of the gun battery, a number of artifacts were found. These include items which have an obvious association with the gun battery, such as ready ammunition boxes and steel doors, as well as other items whose association is less certain.

Ready Ammunition Boxes: Three steel ready ammunition boxes and five (unattached) steel doors for ready boxes were unearthed at the site of the gun emplacements and command post. Although these boxes were deformed, their original dimensions (not including flanges) were estimated as 3'-1" wide, 3'-6" deep, and 4'-0" high. About 9" of that height is due to the base below the 3'-3" tall opening. The width and depth dimensions conform to the footprint measurements of the sloped pads at the two nearby gun emplacements (see HAER HI-85-B and HAER HI-85-C). One of the ready boxes retains its interior configuration of support brackets to hold five rows of shells with five shells in each row. The bracket clearance for each round is 5¾"; this corresponds to the casing diameter dimension of the ammunition for 5-inch guns. These ready boxes were likely salvaged from Navy ships at the same time the 5-inch guns were removed. A ready box for 5-inch shells which was 3'-6" deep could accommodate ammunition types for either 5-inch/25 or 5-inch/38 guns (see HAER HI-85 for more on these guns and their ammunition types). The size and configuration of the five doors found during the excavation match the three ready boxes. The deformed doors roughly measure 3'-4" wide x 3'-6" high; each has two hinges on the exterior and some have remains of a gasket on the interior side. The sealing surface of the gasket matches the 3'-1" x 3'-3" opening of the ready boxes. There are six slotted lugs along the perimeter of each door, two on each of the long sides and one on each of the short sides, which engage into swiveling threaded dogs on the ready boxes. This allows the ready box door to be tightened down onto the gasket and sealed. A steel ring is welded on the outside of the door, centered on the leading edge.

Steel Doors: Three steel doors were unearthed at the site. Two doors have large panels of fixed steel louver vents. The first door is flush metal, very similar to the two doors extant in the battery command center, with three gas-proof flap valves (see above for description). The two doors with fixed louver vents are constructed of steel plate that is ⅞" thick. These doors are 6'-1" high and 2'-2" wide with a 1'-2" wide louver panel that is 4'-8" high. Three short strap hinges, 3¼" wide, are welded to the door. The ends of these straps are formed into a single loop which mates to pins that are set in the doorjamb to form hinges. Each door has a slot in the ⅞" steel plate through which a staple or ring would protrude through for securing the door with a padlock when closed. One door has a D-shaped handle made from a steel rod. These ⅞" thick steel doors with louvers are identical to doors observed at extant reserve ammunition magazines which were part of various antiaircraft gun positions constructed around Pearl Harbor during WWII.[5]

Steel Plates: Four trapezoidal pieces of ½" thick steel plate were also discovered during excavation of the site. All of the plates are 4'-6" high and measure 5'-2" along their base edges.

[5] Mason Architects, Inc. *Historic Context Report and Historic Preservation Plan for World War II Defensive Accessory Facilities, Building Types Assessment: Splinterproof Shelters and Gun Emplacements.* (Honolulu: Naval Facilities Engineering Command, Pacific, November 2004), 1.2-36.

The top edge of one measures 7'-5" and the top edges of the other three measure 6'-1". Each plate has four holes, approximately ⅝" diameter, which are located along the short (4'-6") sides, about 12" from the corners of the plates. These plates might have been used as splinter shields for the 5-inch guns or for the gun director.

Additional Items: A galvanized steel bucket with a metal handle was also unearthed. This was crushed but appears to be about 2½ gallon capacity. Another object was a crushed, hollow metal sphere (about 8" to 12" in diameter) fixed to a 2'-0" long bent metal rod (¼" in diameter) with a small metal bracket at its opposite end. The crushed sphere and bracket appear to be non-ferrous, they are not rusted and show a green patina. This object calls to mind a floater (for sensing the level of liquid in a reservoir or sump) which would be fixed to either a supply line for filling (as the liquid level went down), or to a pump for emptying (as the liquid level rose).

Summary

This structure was likely the Battery Commander's Station (Command Center)/ Plotting Room/ Fire Control Switchboard Room for a battery of four 5-inch/ 25 caliber antiaircraft guns. Two of the four gun emplacements that would have been controlled by this command center were unearthed (see HAER HI-85-B and HAER HI-85-C). At this Battery Command Center, the original above-ground portion may have contained sighting instruments for the guns, including a naval Mark 19 gun director. This may have been mounted at the 3'-8" square plate that is set in the concrete of the northeast corner of the structure. Other instruments associated with 5-inch/25 guns that could have been installed in this structure are: a rangefinder, a spotting telescope, and a battery commander's telescope. The underground portion of this structure was likely used as plotting room and fire control switchboard.[6]

HISTORICAL CONTEXT

For historical context of this structure see the overview report for this antiaircraft battery, HAER HI-85, U.S. Naval Base, Pearl Harbor, Ford Island 5-Inch Antiaircraft Battery.

SOURCES

A. Architectural Drawings:

No drawings of the antiaircraft battery were located for this report.

B. Early Views:

Aerial photos of Ford Island taken during the war are available at the Hawaii State Archives, Admiral Furlong Collection. An aerial photo showing the gun position in January 1943 (#80-G-451261) is available at National Archives II, College Park, MD.

C. Likely Sources Not Yet Investigated:

Additional records of the Hawaiian Department Engineer are located in Record Group 494, at the National Archives II, College Park, Maryland.

[6] John D. Bennett, memorandum to Ann Yoklavich, Mason Architects, 23 July 2007.

D. Bibliography:

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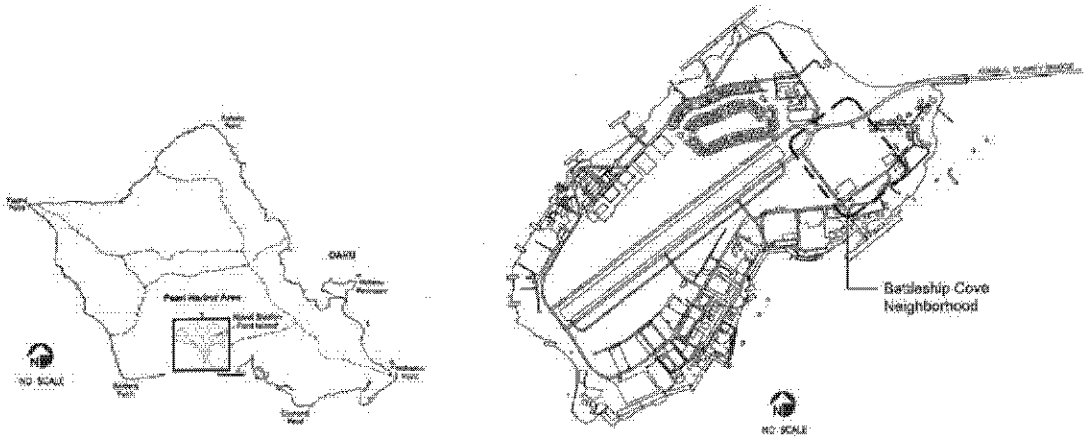
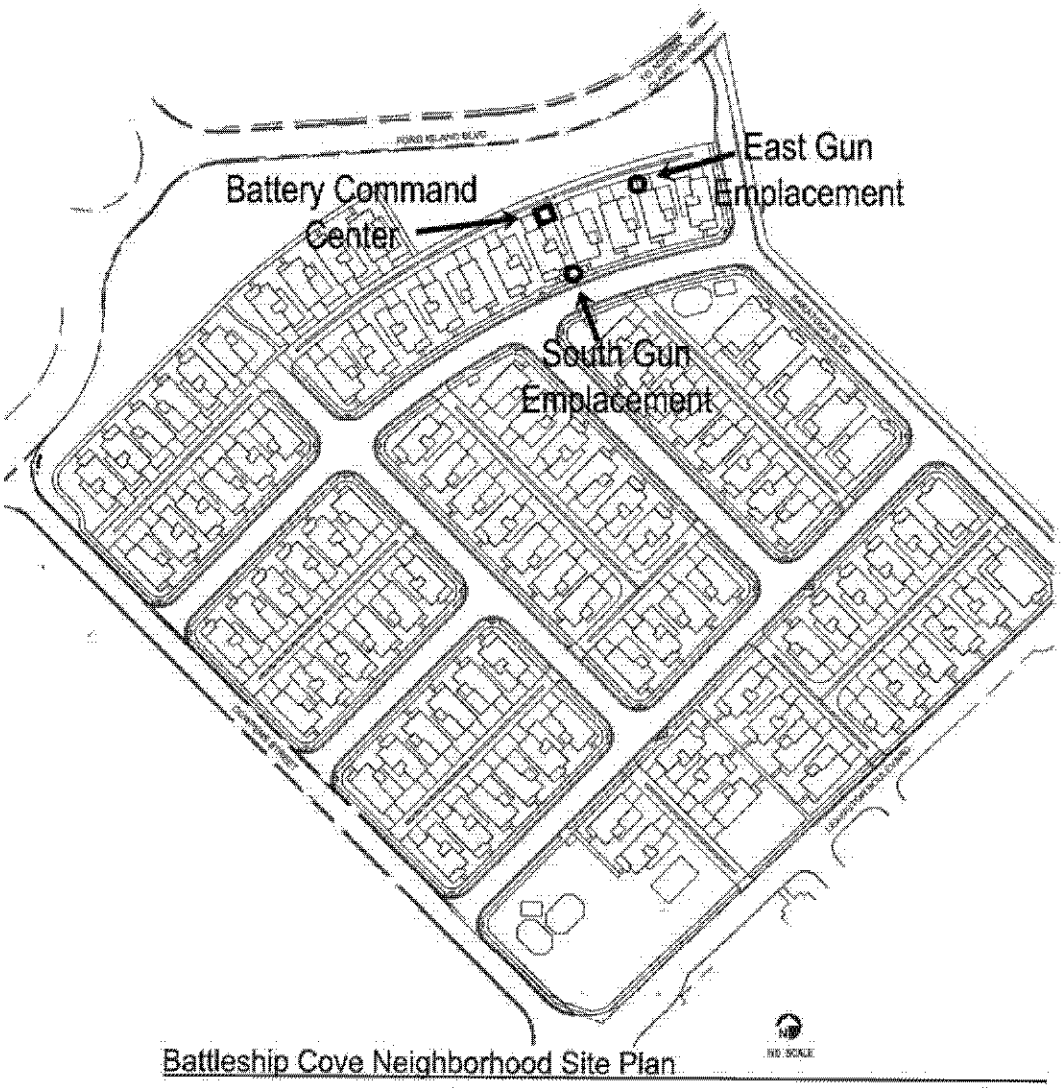
PROJECT INFORMATION

This report was prepared to document the structures discovered and unearthed in March and April 2007 at Ford Island, Pearl Harbor National Historic Landmark, during the excavation phase of work to construct new military housing there. After recordation of the discoveries, the underground infrastructure that prompted their discovery was re-routed to avoid the structures and they were re-interred. All artifacts unearthed were placed back into the structures before they were covered. Large-format photography for this report was done in June 2007 by David Franzen of Franzen Photography, Inc. Field work and research were done by Dee Ruzicka and Ann Yoklavich, architectural historians with Mason Architects, Inc., in July and August 2007. John D. Bennett of Oahu, a frequent contributor to *The Coast Defense Journal* and a scholar of coast artillery in Hawaii, was consulted and provided information on the structures and on naval antiaircraft shore batteries. Also, Tony DeGiulian, a naval weapons scholar and author of the website NavWeaps.com provided information regarding 5-inch/25 naval guns, mounts, and ammunition.

Location map and site plan.

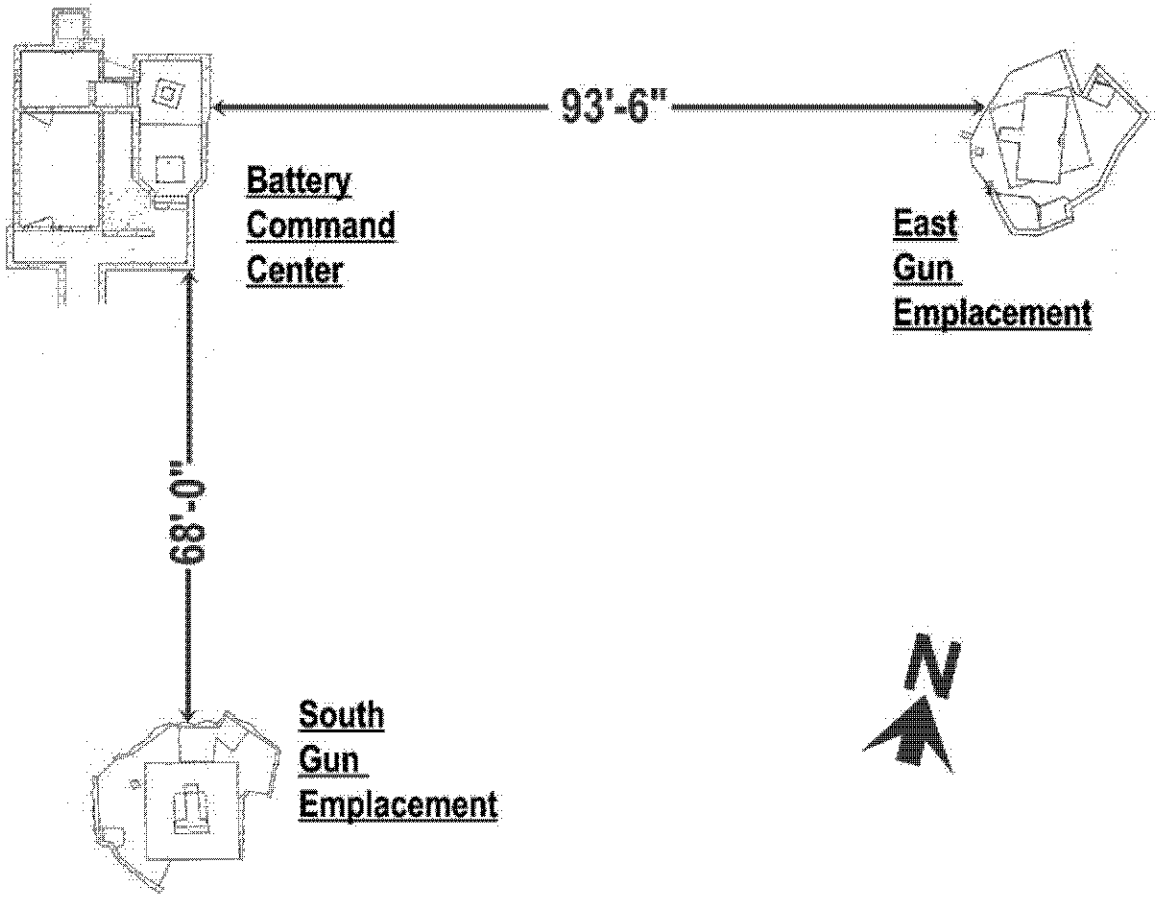


Location Map Vicinity Map of Ford Island



Battleship Cove Neighborhood Site Plan

Site plan showing the orientation of the three 5-inch antiaircraft battery structures discovered in March and April 2007, with the distances between them. No scale.



Sketch plan of 5-inch antiaircraft battery, battery command center. No scale.